Aircrew & Flightline Tasks

24 May 2004

Developed as part of the
National Emergency Services Curriculum Project

O-3006

Marshall an Aircraft

CONDITIONS

You are a new/old member on a mission, and are asked to be a Flight Line Marshaller.

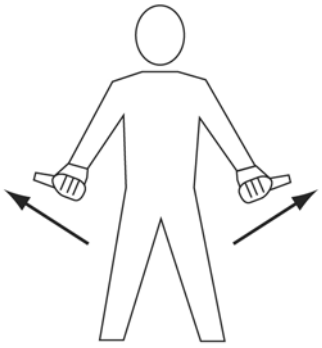
OBJECTIVES

1. Know how to use the proper hand and arm signals to direct the aircraft.

TRAINING AND EVALUATION

Training Outline

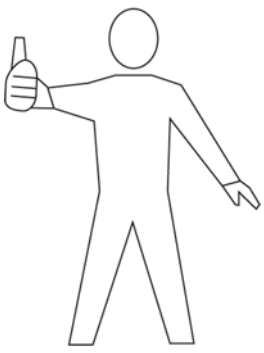
1. The hand signals taught in this course are universal and are used by all aviation services. REMEMBER some pilots may not be familiar with these signals.
   a. These signals are designed for use by the marshaller, using flashing lights when necessary, to facilitate observation by the pilot, and facing the aircraft in a position to the pilots left.
      1. For fixed wing aircraft – within view of the pilot at all times.
      2. For helicopters – where the marshaller can best be seen by the pilot.
   b. The meaning of the relevant signals remains the same if batons, illuminated wands or flashlight's are used.
   c. The aircraft engines are numbered, for the marshaller facing the aircraft, from right to left (i.e., # 1 engine being the port or left outer engine).
2. Marshalling signals are a very important part of any flight line operation, and the knowledge of their meaning by both aircrews and marshaller's are imperative. The following signals will be used on all CAP flight lines to provide a safe environment for both aircraft and personnel.



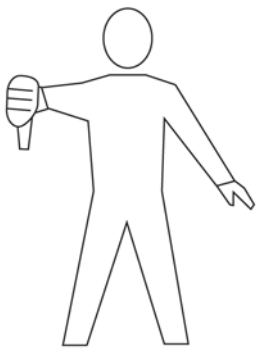
Outward motion with Thumbs - **PULL CHOCKS**

Circular motion of right hand at head level with left arm pointing to engine. **START ENGINE**

Raise arm, with fist clenched, horizontally in front of body, and then extend fingers. **RELEASE BRAKE**

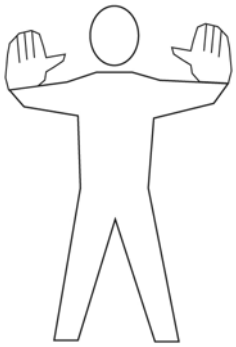


Thumb up **OK or YES**

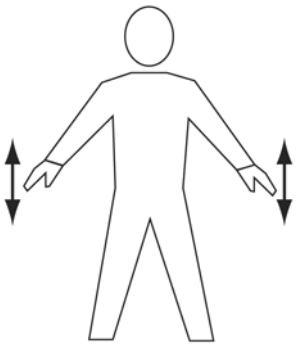


Thumb down **NOT OK or NO**

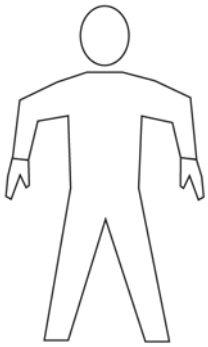
Arms above head in vertical position with palms facing inward. **THIS MARSHALLER**



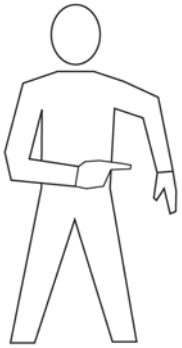
Arms a little aside, palms facing backwards and repeatedly moved upward and backward from shoulder height. **MOVE AHEAD**



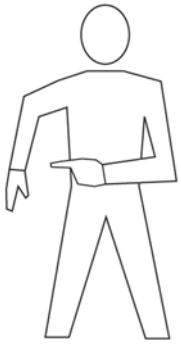
Arms down with palms toward ground, then moved up and down several times. **SLOW DOWN**



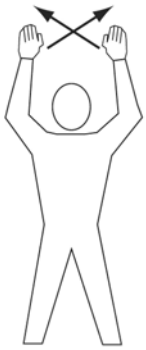
Arms extended with forearm perpendicular to ground. Palms facing body. **HOT BRAKES**



Arms extended with forearm perpendicular to ground. Palms facing body. Gesture indicates right side of aircraft. **HOT BRAKES-RIGHT SIDE**



Arms extended with forearm perpendicular to ground. Palms facing body. Gesture indicates left side of aircraft. **HOT BRAKES-LEFT SIDE**



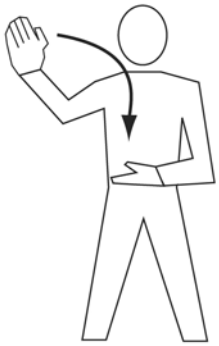
Waiving arms over head. **EMERGENCY STOP**

Right or left arm down, other arm moved across the body and extended to indicate direction of next marshaller. **PROCEED TO NEXT MARSHALLER**

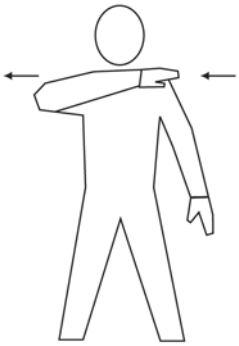
Point right arm downward, left arm repeatedly moved upward-backward. Speed of arm movement indicating rate of turn. **TURN TO THE LEFT**

Point left arm downward, right arm repeatedly moved upward-backward. Speed of arm movement indicating rate of turn. **TURN TO THE RIGHT**

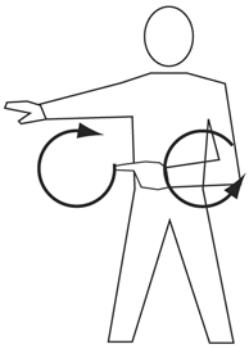
Arms crossed above the head, palms facing forward. **STOP**



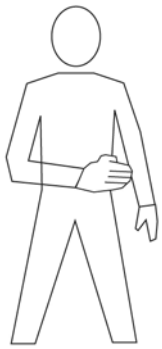
Make a chopping motion with one hand slicing into the flat and open palm of the other hand. Number of fingers extended on left hand indicates affected engine.
FEATHER/FUEL SHUT OFF



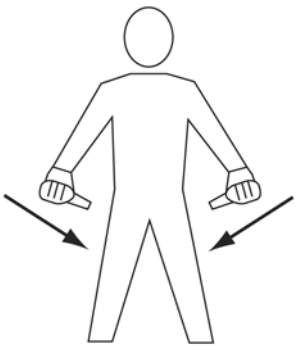
Either arm and hand level with shoulder, hand moving across throat, palm downward. **CUT ENGINES**



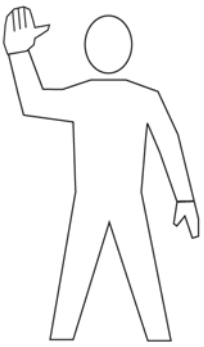
Make rapid horizontal figure-of-eight motion at waist level with either arm, pointing at source of fire with the other.
FIRE ONBOARD



Raise arm and hand, with fingers extended horizontally in front of the body, then clench fist.
ENGAGE BRAKE



Inward motion with Thumbs - **INSERT CHOCKS**



Right arm raised; elbow shoulder height; palm forward.
MARSHALLER FINISHED

Additional Information

More detailed information on this topic is available in the Flight Line Text and reference material.

Evaluation Preparation

Setup: Provide an aircrew and aircraft for this evaluation. Set up an obstacle course whereby the student and/or students can demonstrate all the proper hand signals.

Brief Student: Demonstrate the proper hand and arm signals.

Evaluation

Performance measures	Results
1. Demonstrate all of the required hand and arm signals.	P F

Trainee must receive a pass on all performance measures to qualify in this task. If the individual fails any measure, show what was done wrong and how to do it correctly.

O-3007

Be a Wing Walker

CONDITIONS

You are a new/old member on a mission, and are asked to be a Flight Line Marshaller.

OBJECTIVES

1. Know how to be a wing walker and how to properly help the tower.

TRAINING AND EVALUATION

Training Outline

1. Since you will be moving aircraft in and out of congested spaces, you should always have another person act as your wing walker.
   a. A wing walker is essential, because it is impossible for the marshaller to see all the extremities of the aircraft from the marshalling position. Using a wing walker is most important when marshalling an aircraft into a close parking spot.
   b. As the marshaller, you have the ultimate responsibility for the aircraft. If you lose contact with your wing walker, or you do not understand the directions being given by the wing walker, stop immediately. Verify that you have adequate clearance.
   c. If you are working as a wing walker, always maintain eye contact with the marshaller. The same hand signals that you used to direct a pilot should be used to direct the person marshalling. Use crisp and distinct hand signals and vocalize the situation if necessary. Do not hesitate to call out "STOP" if you see a problem or are unsure of the clearances.
2. Since you will be moving aircraft in and out of congested spaces, you should always have another person act as your wing walker.
   a. A wing walker is essential, because it is impossible for you to see all the extremities of the aircraft from the tow position. Using a wing walker is most important when pushing an aircraft back into a hangar or another parking spot.
   b. As the tow operator, you have the ultimate responsibility for the aircraft. If you lose contact with your wing walker, or you do not understand the directions being given by the wing walker, stop immediately. Verify that you have adequate clearance.
   c. If you are working as a wing walker, always maintain eye contact with the tower. The same hand signals that you used to direct a pilot should be used to direct the person towing. Use crisp and distinct hand signals and vocalize the situation if necessary. Do not hesitate to call out "STOP" if you see a problem or are unsure of the clearances.
3. Since we do not have tugs, a tow team is necessary to help both the tower and wing walkers to get our aircraft from one point to another. In some cases the tower can move an aircraft by themselves, but help makes the move easier and safer.
   a. The tow team will be properly positioned at aircraft push-points.
   b. Their only job is to push. This frees the tower and wing walker to doing only their assigned jobs.
   c. The tow team will carry chocks during the towing operation in case of an emergency.
   d. After stopping, hold the aircraft in position until it is properly chocked.

Additional Information

More detailed information on this topic is available in the Flight Line Reference Text.

Evaluation Preparation

Setup: Parked aircraft, three wing walkers

Brief Student: Position a wing walker at each wing tip and the tail.

Evaluation

Performance measures	Results	
1. Demonstrate the ability to be a wing walker?	P	F
2. Demonstrate the ability to serve as a tow team member?	P	F

Trainee must receive a pass on all performance measures to qualify in this task. If the individual fails any measure, show what was done wrong and how to do it correctly.

O-3008

Perform Aircraft Startup Procedures

CONDITIONS

You are a new/old member on a mission, and are asked to be a Flight Line Marshaller.

OBJECTIVES

1. Know how to use the correct procedures for aircraft startup.

TRAINING AND EVALUATION

Training Outline

1. The following outlines procedures used during engine start up. The marshaller will be positioned within view of the pilot at all times.
   a. Engine starting procedures should be included in aircrew briefing.
   b. The pilot should not start the engine without a marshaller in position.
   c. Check that chocks are removed before engine start.
   d. Before starting the engine, the pilot will let the marshaller know they are ready by holding their hand out the window, moving their hand up and down, and stating “Clear Prop”. The marshaller will the “Clear Prop” warning with a ‘thumbs up’ sign. This signal lets the pilot know the area is clear and the marshaller is ready for engine start.
   e. During night operations flashing of the landing lights may be substituted for the hand signals.

Note: Every aircrew will need time to go through their checklist before moving from one point in this procedure to the next. Marshallers will need to be patient and give the aircrew time to complete their checklists.

Additional Information

More detailed information on this topic is available in the Flight Line Text and reference material.

Evaluation Preparation

Setup: A parked aircraft
Brief Student: Demonstrate the proper place to stand and give the correct signal for ‘Engine Startup’.

Evaluation

Performance measures	Results
1. Demonstrate the ability to properly work with an aircrew during aircraft startup.	P F

Trainee must receive a pass on all performance measures to qualify in this task. If the individual fails any measure, show what was done wrong and how to do it correctly.

O-3009

Perform Aircraft Taxi Procedures

CONDITIONS

You are a new/old member on a mission, and are asked to be a Flight Line Marshaller.

OBJECTIVES

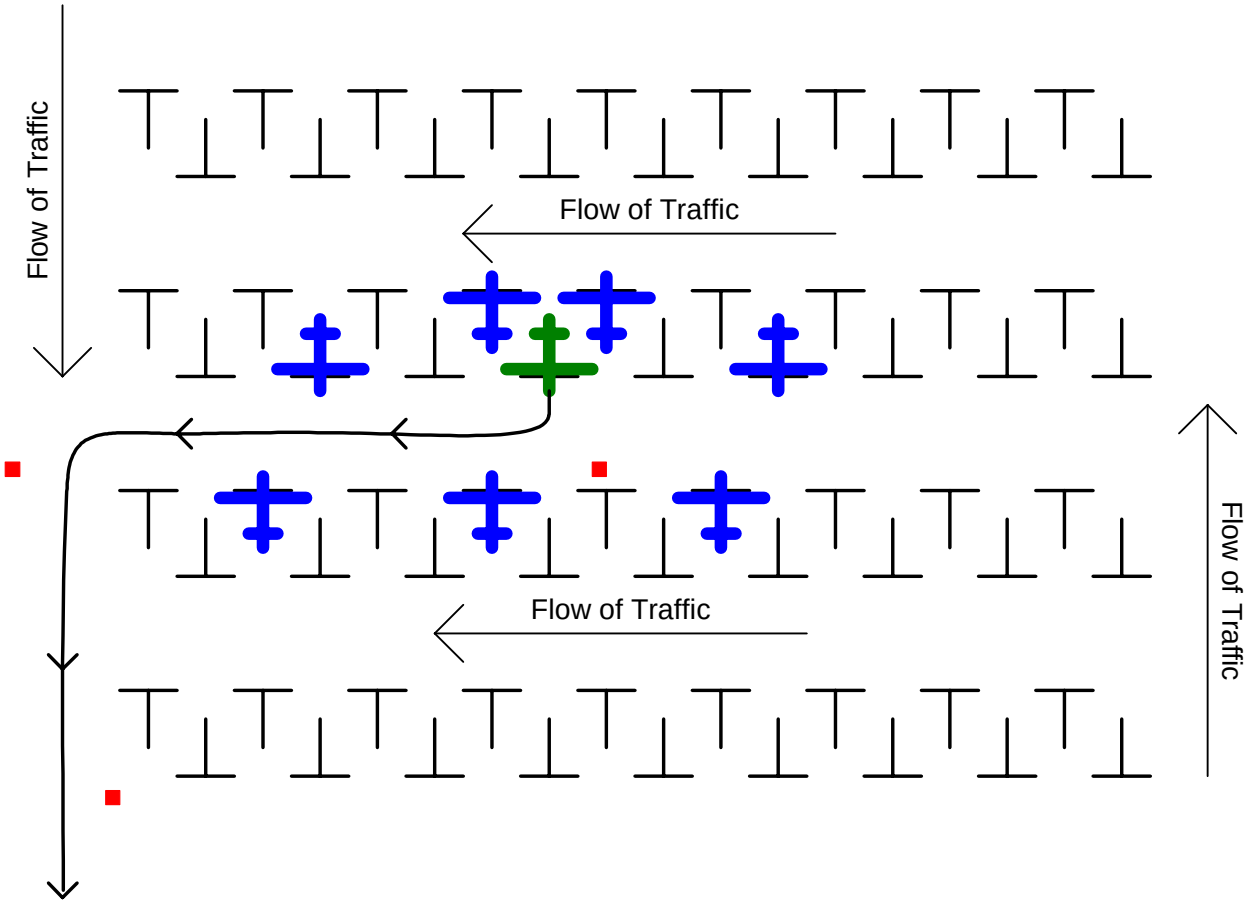
1. Know how to use the correct procedures for taxiing an aircraft.

TRAINING AND EVALUATION

Training Outline

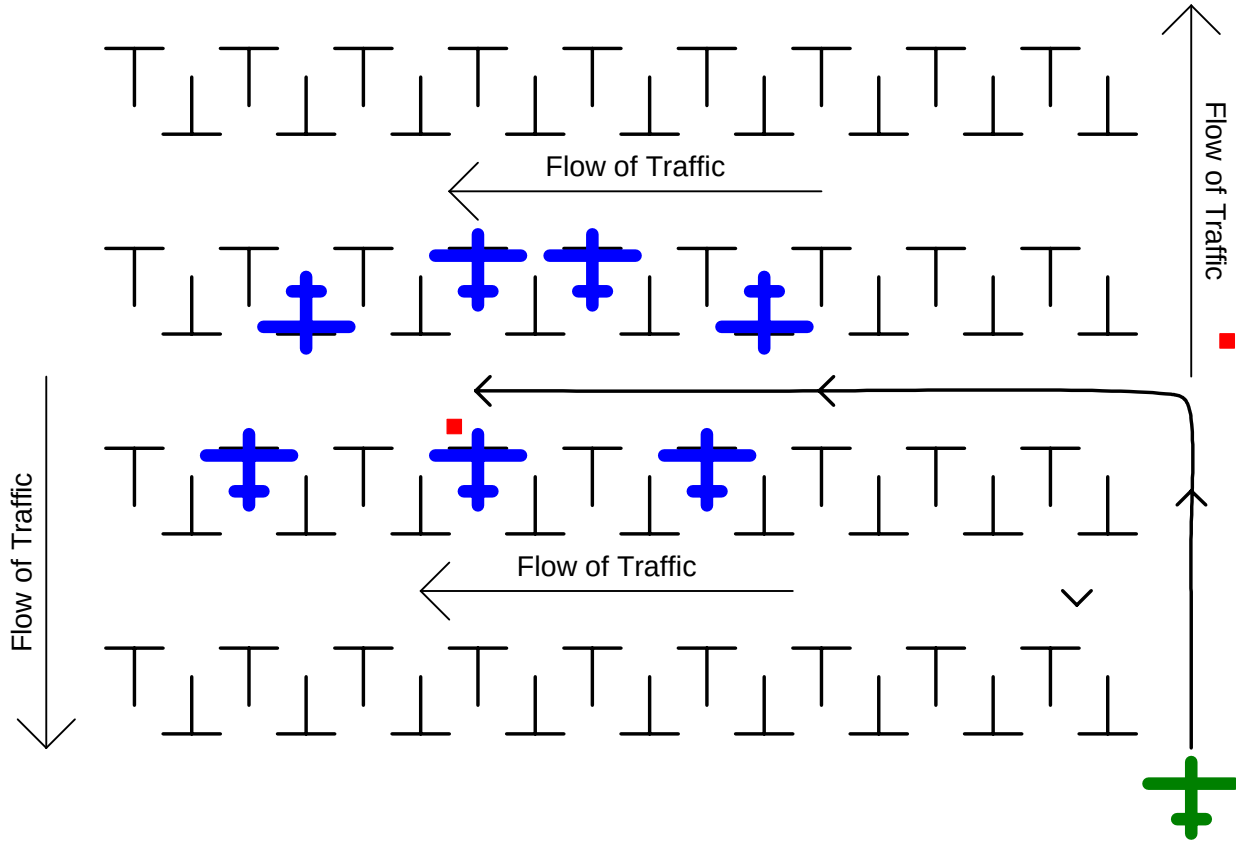
1. The following outlines procedures used to taxi the aircraft. The marshaller will be positioned within view of the pilot at all times.
   a. Taxi procedures should be included in aircrew briefing.
   b. The pilot should not begin to taxi without the marshaller's permission.
   c. When the pilot is ready to taxi, they will turning their pulse light on or flashing their landing/taxi light.
   d. The marshaller will give the pilot permission to taxi using standard taxi signals.
   e. The pilot may then taxi to designated run-up area.
   f. During Taxi operations if you see an aircraft taxiing too fast, signal them to slow down by using the appropriate marshalling signal.
2. CAP personnel marshalling aircraft must position themselves to meet the following requirements.
   a. Never position yourself in the path of an oncoming aircraft
   b. Never position yourself in a location where any part of an aircraft will pass over you
   c. Never walk backwards on the ramp
   d. Never run on the ramp
   e. Always marshal aircraft entering a congested ramp under CAP control
   f. Always get enough personnel to control aircraft movement without compromising safety
   g. Always position yourself where you can maintain direct eye contact with the pilot-in-command (ten feet to the pilot's left of the left wing tip and far enough in front of the aircraft to allow for a turn in front of you is ideal)
   h. Always hand the aircraft off to the next marshaller before the pilot losses sight of you.
3. Careful planning of the number of resources and their position can accomplish this with ease. Suggested marshaller positioning is shown on the following diagrams for departing (fig. 1) and arriving (fig. 2) aircraft.

Figure 1



Departing aircraft are marshaled out of their spot and released once clear of the congested area.

Figure 2



Arriving aircraft are marshaled into place just passed their assigned parking spot and pushed back into place.

Additional Information

More detailed information on this topic is available in the Flight Line Text and reference material.

Evaluation Preparation

Setup: Working with an aircrew and aircraft, let each student perform required taxi procedures

Brief Student: Demonstrate the correct signal for taxiing an aircraft.

Evaluation

Performance measures	Results	
1. Demonstrate the ability to taxi an aircraft.	P	F

Trainee must receive a pass on all performance measures to qualify in this task. If the individual fails any measure, show what was done wrong and how to do it correctly.

O-3010

Perform Aircraft Shutdown & Chocking Procedures

CONDITIONS

You are a new/old member on a mission, and are asked to be a Flight Line Marshaller.

OBJECTIVES

1. Know the correct procedures for engine shutdown.
2. Know the correct procedures for chock the wheels.

TRAINING AND EVALUATION

Training Outline

1. The following outlines procedures used to park and shut down the aircraft. The marshaller will be positioned within view of the pilot at all times.
   a. The pilot should follow the taxi plan and marshallers directions (with help from wing walkers and aircrew as needed).
   b. The pilot should indicate engine shutdown by showing the marshaller the aircraft keys.
   c. The marshaller will indicate when chocks have been installed, and at that time the pilot should release the parking brake.
   d. The aircrew on all aircraft will perform a post-flight inspection after each sortie.
2. After the engine is shut down and the pilot shows their keys, the aircraft should be chocked.
   a. Have another person place a chock in front of and behind the main landing gear wheels.
   b. Signal chocks in place.
   c. Signal release parking brake.
   d. After completing chocking procedures for the aircraft, marshallers are free to move to their next assignment
3. Wheel chocks will be placed fore and aft of the main landing gear or as specified in applicable aircraft manual.

Additional Information

More detailed information on this topic is available in the Flight Line Reference Text.

Evaluation Preparation

Setup: parked aircraft, another marshaller.

Brief Student: Demonstrate the signal to shutdown the engine, chock wheels, release parking brake.

Evaluation

Performance measures	Results	
1. Demonstrate proper shutdown procedures?	P	F
2. Demonstrate proper chocking procedures?	P	F

Trainee must receive a pass on all performance measures to qualify in this task. If the individual fails any measure, show what was done wrong and how to do it correctly.

O-3011

Tie Down an Aircraft

CONDITIONS

You are a new/old member on a mission, and are asked to be a Flight Line Marshaller.

OBJECTIVES

1. Know how to properly tie down an aircraft.

TRAINING AND EVALUATION

Training Outline

1. This will be accomplished according on type of aircraft. When ropes are used, they will be tied to designated mooring fittings on aircraft. Normally a bowline knot will be used to prevent slippage and to provide secure fastening. Just enough slack should be allowed to prevent excessive stress on the wings, fittings and rope due to tires and strut expansion or deflation and to prevent contraction of the tie-down ropes due to moisture or wetness. The mooring points on the ground should be as close as possible directly under the respective mooring points on the aircraft. This diagram shows a vertical anchor using straight link coil chain for connection between the wire rope and aircraft wing. One link on the free end is then passed through a link of the taut portion and a safety snap is used to keep the link from passing back through. Any load on the chain is borne by the chain itself instead of the snap.
2. The following will review procedures as outlined in CAPR 66-1 (1 February 2000).

15. Storage and Tie-Down. Region and wing commanders are responsible for assuring that all possible preventive measures are taken to safeguard corporate 6 CAPR 66-1 (E) aircraft from wind and weather damage. Aircraft should be kept in a hangar whenever possible. Aircraft parked in the open shall be tied down at the three approved tie-down points (wings and tail) and securely chocked to prevent wind damage. The control lock shall be installed. Aircraft in extended outside storage shall be tied at four points (nose, wings, and tail).

a. Tie-Down Anchors. There are many methods of anchoring tie-downs. Satisfactory tie-down anchors may be constructed as shown at Attachment 3. Variations may be necessary when local conditions dictate.

b. Tie-Down Ropes. Tie-down ropes with tensile strength of 3,000 pounds or greater shall be used. Nylon or dacron tie-down ropes are recommended. Refer to Attachment 3 for rope specifications.

c. Tie-Down Chains. Chains shall not be used directly from aircraft mooring points to an anchor point because of excessive impact loads on wing spars. When chain tie-downs are used, they shall be attached to wire rope anchors as depicted in Attachment 3. Wire rope anchors are constructed of two continuous lengths of parallel wire rope passed through the anchor points. The tie-down chains shall be attached to the wire rope with round pin galvanized anchor shackles. This allows the chains to float along the wire rope to reduce impact loads. Chain links used for tie-down must be at least 5/16-inch steel and a proof load of 2,720 pounds and breaking load of 5,440 pounds. All fittings must be equally as strong and chains should be secured without slack.

d. Spoilers. In high wind areas, the use of sandbags, or spoiler boards as described in FAA advisory circular 20-35C, are recommended.

Additional Information

More detailed information on this topic is available in the Flight Line Text and reference material.

Evaluation Preparation

Setup: Parked aircraft, tie down ropes, and anchors.

Brief Student: Demonstrate how to properly tie down the aircraft.

Evaluation

Performance measures	Results
1. Demonstrated how to properly tie down an aircraft.	P F

Student must receive a pass on all performance measures to qualify in this task. If the individual fails any measure, show what was done wrong and how to do it correctly.

O-3012

Demonstrate Proper Ground Safety Observer Techniques

CONDITIONS

You are a new/old member on a mission, and are asked to be a Flight Line Marshaller.

OBJECTIVES

1. Understand how to plan where to stand to direct the aircraft, so you can see and be easily seen by the pilot, and you won't have to move while the aircraft taxi.
2. How to assist the Flight Line Supervisor in planning the best parking areas, and taxiway paths to use.

TRAINING AND EVALUATION

Training Outline

1. Determine the proper position to stand**,** where you can be seen and not have to move as aircraft are directed to the ramp area.
   a. The proper place to stand is on the outside corner of a taxiway intersection. The aircraft will taxi off the runway toward you and turn the direction you give them, and not cross the centerline.
   b. When the aircraft is approaching the ramp area, contact the aircraft by radio to find out if the pilot is going to refuel before parking the aircraft?
   c. Direct the aircraft to the refueling area first, and then back to the staging area to park.
2. Determine the proper place to stand when parking an aircraft.
   a. The proper place to stand is ahead of the aircraft, off center; on the side opposite from the direction you want the pilot to turn.
   b. Never stand directly in front of the prop, and hope the brakes hold.
   c. Park the aircraft on the paved part of the ramp area, if possible.
3. Try to choose taxiway paths that don't cross or traffic goes both ways.
   a. Use different entry and exit from the parking ramp area.
   b. Use different sections of taxiways so the traffic will be one way.

Additional Information

More detailed information on this topic is available in the Flight Line Reference Text.

Evaluation Preparation

Setup: None.

Brief Student: Explain safety procedures for use on the flight line and what to watch for.

Evaluation

Performance measures	Results
1. Discussed safety measures?	P F
2. Demonstrated the correct position to stand when marshalling aircraft?	P F

Trainee must receive a pass on all performance measures to qualify in this task. If the individual fails any measure, show what was done wrong and how to do it correctly.

O-3013

DEMONSTRATE THE ABILITY TO FUEL AN AIRCRAFT

CONDITIONS

You are a new Flight Line Marshaller trainee and need to learn to interact with aircraft and aircrews on the flight line to refuel aircraft safely and efficiently to support mission operations.

OBJECTIVES

The student will be able to safely fuel a CAP aircraft for use on a mission.

TRAINING AND EVALUATION

Training Outline

1. Safe expeditious work is necessary for a smooth running flight line. Fueling aircraft is one of the primary duties of flight line personnel.
    a. Never approach an aircraft while the prop is turning
    b. Make sure the chocks are in place to prevent the aircraft from moving while you are working.
    c. Ground the aircraft to the fueling pump before beginning your work
    d. Use foot/hand holds to access the fueling points
    e. Only add fuel to the level indicated. DO NOT OVERFILL.
    f. Be mindful of spillage as aviation fuels present environmental hazards
    g. Replace the fuel caps before moving away from the fueling points.
    h. Document how much fuel was taken on

Additional Information

More detailed information on this topic is available in the Flight Line Reference Text.

Evaluation Preparation

Setup: Present the student with several opportunities to interact with flight crews and refuel aircraft.

Brief Student: Safety and efficiency are requirements for Flight Line Operations. Utilize the briefing and checklist to refuel and aircraft.

Evaluation

Performance Measures	Results	
The individual successfully refuels an aircraft:		
1. Approaches the aircraft safely.	P	F
2. Ensures aircraft is chocked	P	F
3. Grounds the aircraft at the fuel pump	P	F
4. Uses appropriate hand and footholds for accessing fueling points	P	F
5. Adds fuel to the levels indicated without spilling	P	F
6. Caps fuel tanks	P	F
7. Documents fuel dispersed	P	F

Student must receive a pass on all performance measures to qualify in this task. If the individual fails any measure, show what was done wrong and how to do it correctly.

O-3014

DEMONSTRATE KNOWLEDGE OF FLIGHT LINE SECURITY

CONDITIONS

You are a new Flightline Marshaller trainee. Flight line safety and security is your number one priority.

OBJECTIVES

The student should understand the security concerns and requirements for CAP when operating on a flightline.

TRAINING AND EVALUATION

Training Outline

1. Safe expeditious work is necessary for a smooth running flight line. Discerning who should and should not be on the flight line and making sure they enter and leave safely is necessary for flight line security.

a. People on the flight line should have the proper uniforms and equipment.

1. Eye and ear protection
2. Red or Orange vest
3. Highly visible marshalling battons

b. If personnel on the flight line are not Marshallers or aircrew members heading to an aircraft, advise the members to stay behind the caution line.

c. Monitor personnel moving around aircraft to ensure they are conducting themselves safely and efficiently.

d. Vehicles that belong on the flight line are easily identified-work vehicles, fuel trucks, and towing equipment.

e. Other vehicles or personnel should be reported to the Flightline Supervisor.

Additional Information

More detailed information on this topic is available in the Flight Line Reference Text.

Evaluation Preparation

Setup: Present the student with several opportunities to interact with flight crews, bystanders, and other mission personnel.

Brief Student: Utilize the briefing and checklist to maintain security on the flight line.

Evaluation

Performance Measures	Results	
Visitors to the flight line are met and briefed; crews are delivered safely to their aircraft.		
1. Members are provided with ear protection if they do not have it	P	F
2. Members are advised to stay behind the caution line while the flightline is active	P	F
3. Nonessential personnel or dangerous activity is reported to the Flightline Supervisor	P	F
4. POV's and non-mission or non-flight line vehicles are noted and reported to the Flightline Supervisor	P	F

Student must receive a pass on all performance measures to qualify in this task. If the individual fails any measure, show what was done wrong and how to do it correctly.